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INSECTICIDE ACTIVITY OF *DATURA INNOXIA*ON MIGRATORY LOCUST: *LOCUSTA MIGRATORIA* (LINNÉ, 1758) (OEDIPODINAE, ACRIDIDAE)

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ABSTRACT

The purpose of this work is to study the insecticide effect of plantextracts aqueous *Daturainnoxia* on the fifth instars larvae of migratory locust: Locusta *migratoria*. This effect is measured by the rate of mortality, length of larval stages, the weight change and feeding activity.

Both extracts caused mortality of 56.67% is achieved on the 7th day from, extensions of the durations of larval stages ranging from 4 days to 6 days. The insecticidal effect of these extracts was demonstrated by a decrease in weight gain, disruption of feeding and activity.

KEYWORDS: Migratory Locust, *Locusta migratoria*, Datura, Locust Control Strategy, Plant Extract

INTRODUCTION

There are 12000 locust species in the world; 500 species can cause damage and 20 of them are considered pests fierce

In front the damage inflicted locusts for natural vegetation, pastures and crops and calamities that may arise due to their attacks; a major concern of responsible for locust control is to identify and minimize losses by maintaining sustainable locust populations in solitary phase (or low transient) and that by using a series of methods of destruction.

Interrupt the dynamics of a locust plague involves excessive use of chemical inputs they considered a temporary measure to deal with critical situations. These insecticides are very persistent and can persist for long periods in soil, plant tissue and animal fats which constitute a danger to public health and a brake on the development and culture, as an example in the Sahel and West Africa the locusts cause an annual average loss of grain production in the order of 30%.

Indeed in Africa, especially the West, the Sahel and South Grand Maghreb, suffer the pangs together of two evils, we do not really know that stronger dangerousness:

On the one hand, the locust invasion and its immediate damage, massive but passenger; on the other hand, large-scale spraying of chemicals whose effects is pernicious fear of long-term risks.

Against locusts, that preventive control (in a built-in setting) is receivable, at a time economic and ecological; all other shape of struggle is a confession of failure. However, we must admit that the curative struggle must be again often exercised and, in this case. All intervention must be efficient; because we must act quickly and efficiently to get the maximum of results with the minimum of means.

To achieve this goal without the disadvantages of exposure to synthetic pesticides, it is interesting to find other methods and alternatives, crop protection. Already, the insecticidal effects of some plants have been proven by many authors. In this context adds our study is to measure the insecticidal activity of aqueous extract of *Daturainnoxiaon L. migratoria,*

Daturainnoxia

The datura are common plants of waste places, roadsides and fields. Sometimes ornamental.

D. innoxia Mill .Hardy annual plant that grows in clumps from a height of 90-120 cm.Its powerful rod, yellowish green, branches dichotomously. Its alternate leaves are oval, elongated broad petiole pubescent. Flowers, white or lilac, are large (6-10 cm), solitary, funnel-shaped pleated. It flowers from July to October. The fruit is a spiny capsule ovoid. (MARNOTTE et al., 2006). The fruits, which are roughly 5 cm long and 4 cm in diameter, shape of the oval ranges in the conical shape; four valves open at the top, releasing a long central column bearing many light brown seeds.

The important vegetative development of the Datura actually a very competitive weed for summer crops (corn, soybeans, various vegetables). Its toxicity and its psychotropic qualities earned him the name of the herb devil. (MARNOTTE et al., 2006). Datura is a weed that grows all along roadsides. The datura were used by many traditional societies for their psychoactive and hallucinogenic properties, they are rich in alkaloids (hyoscyamine, atropine and scopolamines) in all organs and are poisonous and toxic.

Toute la plante est toxique. Feuilles, fleurs, graines sont employées à des fins toxicomanogènes (ingestion directe, infusions et fumées). (CHAMPY, 2008). En Chine, du Xe au XVIIe siècle, le datura était utilisé dans un mélange de vin et du canabis préconisé comme anesthésique ou broncho-dilatateur. Ses propriétés ont longtemps été utilisées dans la pharmacopée notamment sous forme de cigarettes anti-spasmodiques. (DAUBRESSE, 2008).

The leaves and flowers are used to relieve rheumatic pain, fungal infections (JOUZIER 2005). They offer interesting possibilities because we can extract scopolamine, an alkaloid used as pre-anesthetic in surgery and obstetrics. The yield ranges from 1100 until 1700 kg leaves and 800 kg seeds per hectare.

MATERIALS AND METHODS

Biological Material

For this study, the strain of *Locusta migratoria* comes from individuals caught in a wheat crop conducted under pivots in the Adrar region in Algeria in March 2008.

The breeding is kept in the Department of Zoology at the ENSA.

The mass rearing is conducted under cages with wooden supports, those of the adults and adults are dimensions 60cmx40cmx30cm and each equipped with four nests filled with sterilized sand moistened, and those larvae 5th stage are dimensions 30cmx30cmx60cm; Livestock is subjected to a temperature of 30 ° C ± 2 ° C, the light is ensured by bulbs 75W, a photo periodicity 12h/12h controlled by timers; plastic bowls (40cmx40cm) containing water in order to ensure a humidity of around 50%, the food is changed every 24 hours it is formed on the grass, Dog tooth, cabbage and wheat bran, the latter represents a protein supplement.

Preparation of Aqueous Plant Extracts

The method of extraction adopted is the one adopted by AOUINTY and al, (2006).

The leaves of datura are picked during fruiting in area Bouzeguène in the wilaya of TiziOuzou, in July and August 2009. Datura leaves are washed with distilled water and then dried in an oven heated to 40 ° C for 48h to 72h. They are then ground using a blender until comminution.

A quantity of 200g of leaf powder is added in 1L of distilled previously boiled, after cooling under magnetic stirring for 30 minutes, the mixture obtained is filtered through paper filter, the filtrate is recovered a stock solution initial 200 g per 1000 ml or 20%. Each filtrate was placed in a jar labeled with the name of the plant from which it is extracted and the extraction date.

Dose Selection

We selected three doses distributed in geometric progression of ratio of two. From the dilution of the stock solution to a quarter of the concentration we obtained a solution dose D1 (D1 = 5%) and from its half dilution of the concentration we obtained the solution to the second dose D2 (D2 = 10%). the **third solution is the stock solution to the dose D3 (D3 = 20%).**

Procedure

At emergence, 30 individuals divided into three groups of 10 individuals are subjected to fasting 24 to starve. Each group is weighed separately and apart from a lot with the name of the species, the larval stage considered, the date of emergence, the name of the plant, the dose tested and the number of repetition; L5 and Imago stage was added 10 g of wheat bran. A volume of 6 ml of solution is sprayed into the cages so that the amount of the solution wets the food and individuals; witnesses are sprayed with distilled water.

After 24 hours exposure of individuals to extract, processed food is removed from the cages and was replaced by a food previously rinsed and weighed.

Parameters Measured

Several parameters were measured on the treated and untreated individuals, it is:

- De-count of the dead;
- The duration of the larval stage L5;
- From weight gain;
- From the daily consumption;
- From sexual maturity and time to first spawning.

RESULTS

L5 Mortality

Regarding lots treated with aqueous extract of datura at doses D1 (5%) and D2 (10%), respectively in the 7th and 6th days, a percentage mortality of 30% is recorded and the dose D3 (20%) mortality rate of 56.67% is achieved on the 7th

day from there, mortality rates remain constant. In the control series, no mortality was recorded (Figure 1)

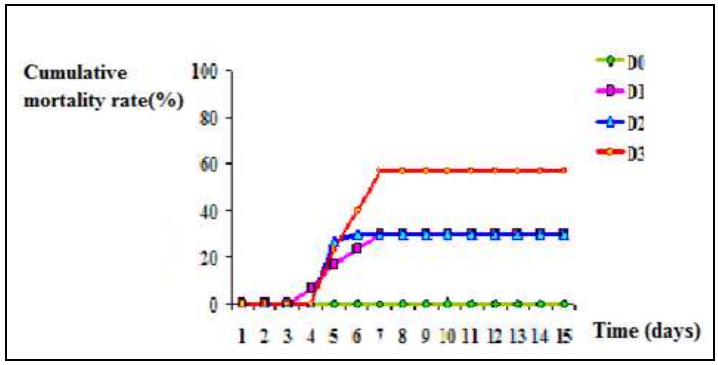

Figure 1: Percentage Cumulative Mortality of L5 Larvae of L. *Migratoria* Treated with Datura

The Duration of L5 Larvae

Witnesses L5 larvae stage of locust made their molts after 8.47 d. Regarding treated datura, prolongation was observed for the 3.33 d dose D1 (5%) was observed and 3.47 d for dose D2 (10%); and end 3.93d for D3 dose (20%) (Figure 2)

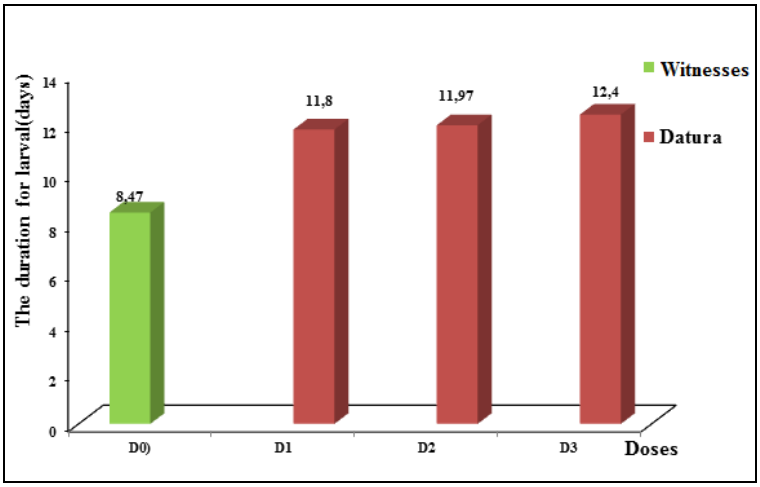

Figure 2: The Duration of the Larval Stage L5 *L. Migratoria* Treated with Datura

Weight Gain

For of witnesses L5, the mean weight gain was 0.66 g, it is remarkably high compared to treated with datura because the dose D1 (5%) reported weight gain of 0.37 g; however D2 dose (10%) and D3 (20%) had respectively 0.29 g and 0.24 g (Figure 3).

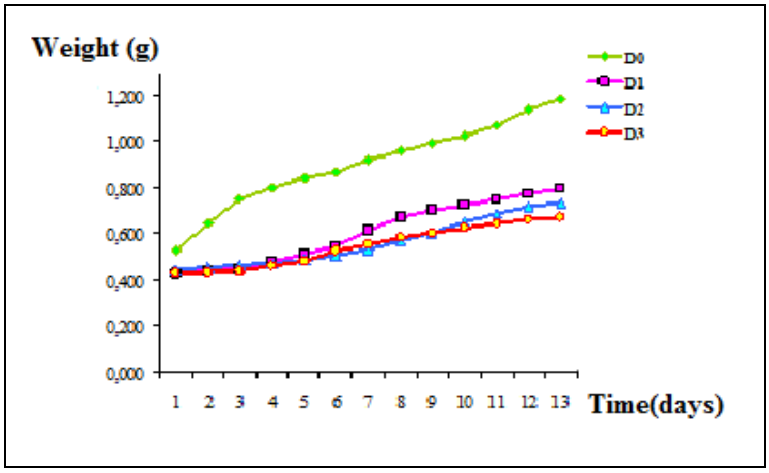

Figure 3: Effect of Datura on the Evolution of the Weight Growth of *L. Migratoria* L5

The Ingested, Consumption

The study of the evolution of weight ingested by L5 larvae of *L. migratoria*, has revealed that first day, the witnesses larvae ate more, compared to larvae treated; as in the witnesses, each larva consumed an average of 0.44 g; while in the treated of datura extract, the quantities consumed are 0.18 g for the low dose D1, 0.16 g for the average dose D2 and 0.06 g for the high dose D3 weight of food consumed, fluctuates daily with a small difference in the thirteen days of monitoring. On the last day, the amounts ingested are evaluated for untreated 0.36 g; for treated with the solution of datura, each larva consumed a daily average 0.27 g for the first dose, an average of 0.19 g for the second dose and an average of 0.17 g at the third dose (Figure 4) ingested.

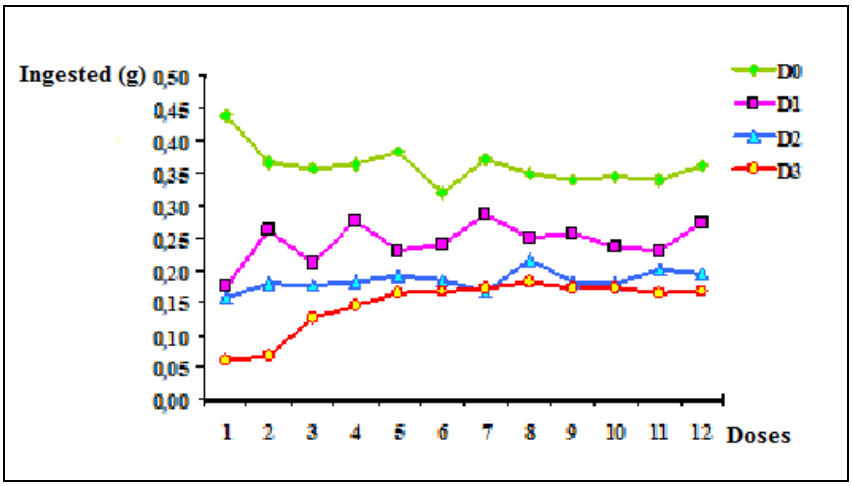

Figure 4: The Weight Change of the Ingested L5 Larvae of *L. Migratoria* Treated with Datura

DISCUSSIONS

The treated larvas show thimble the first day that follows the treatment, of the disorganized movements and agitations interrupted by moments of immobility,; before their death larvas hide under the plant remnants without enlivening no movement. while knowing that leaves of the datura have been picked to the stage of fruition, ABASSI and al(2003), bring back that excerpts of P. harmala to the stage of fruition produce the same effects that the one of a plant to the vegetative stage with however the apparition of least importance effect.

According OULD AHMEDOU and al, (2001), larvas raised on *Glinus.lotoideses* present, before their death of weakness symptoms and a reduced locomotive activity, but contrary to effects generated by méliacéeses no distortion or movements messed up were not observed.

According to REMBOLD (1997), the excerpt of Meliavolkensii tested on the locusts pilgrim in full field showed that the raw gunpowder measured out to 10 g/ha-1s gave a mortality of 28% and one self-timing of the individuals treaty growth.

TAIL and DOUMANDJI (2005), signalled that just after the injection of proteins hydrosolubles extracted of the pink laurel, locusts pilgrims fall then paralyze themselves before to die.

SCHMUTTERER, (1993) demonstrates that a survey on the applied neem oil on *Locustamigratoria*migratorioides. gave 20% of mortality with a solution of 0.04% of azadirachtine, 45% with a solution to 0,1% of azadirachtine and 90% with a solution to 0,2% of azadirachtine.

LEGAL (1989), watch that some locust consume the rich in toxins plants, it is owed to the capacity of toxin elimination very well by the excretory system, or he/it has an arsenal enzymatique capable of détoxiquer these poisonous substances. According to the UNESCO, (1960), the atropine is a stimulant of the central nervous system; it acts in particular on the motor zone of which depends on the coordination of movements. To strong dose it provokes the agitation, loquaciousness and the delirium.

Besides, it returns terminations of the parasympathique in glands, the smooth muscles and the cœur insensible to the action of the acétylcholine.

The exam of treatment results by the plant excerpt of the datura, watch that the gain of middleweight is affected appreciably; because at larvas of the L5S stages of *L. migratoria* are at witnesses of 0,66g; whereas some datura measures out at treaties to the strong person they are 0,24g.

According to DE LOOF, (1991), the excerpt of the plant Ageratum conyzoide, destroyed bodies goes to certain species of bugs and stop the synthesis of the juvenile hormone that plays one important role in the control of several physiological functions as the molt and the reproduction.

These slowing in weight evolution are owed to the action of alkaloids of this plant, whose precursors are the atropine, the hyoscyamine and the scopolamine. These appear by unrests of the balance and the convulsive movements. These demonstrations imply changes of the nervous system that control the biologic and physiological activity of the organism.

CONCLUSIONS

Plant extracts have played an important role early in agricultural activities of mankind and are the basis of several former observations that have structured the emerging disciplines of biology late seventeenth century, they are back on the agenda at the beginning of the twenty-first century because of societal choice now facing our entire planet, including globalization, sustainable development requirements more informed consumer and the preservation of biodiversity.

It is time to take stock of their past use and prospects to them in the context of sustainable agriculture.

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